What is claimed is:

1. A method of preparing a pulp fiber sample to be analyzed, comprising:

preparing a fluorescent stain solution;

adding a predetermined amount of pulp fibers to a predetermined amount of the stain solution;

mixing the pulp fibers and the stain solution to disperse the pulp fibers in the stain solution and create a slurry; and

mixing pulp fiber slurry with a second solution to form a pulp fiber suspension.

2. The method of claim 1, wherein the second solution is a bleach.

3. The method of claim 1, comprising holding the slurry in a container, and removing said pulp fiber sample from the container and admixing it with the second solution in a conduit.

4. The method of claim 3, wherein the second solution is a bleach.

5. The method of claim 1, further comprising providing a flow cell for the pulp fiber sample, directing the pulp fiber sample into the flow cell, and holding the pulp fiber sample in the flow cell, said flow cell including a transparent wall permitting the pulp fiber sample to be imaged while in the flow cell.

6. The method of claim 1, wherein the second solution comprises dilution water and bleach present in an amount sufficient to permit reaction of the bleach with the stain in solution to an extent desired without an undesirable amount of reaction of the bleach with stain that is bound to the pulp fiber sample.

7. The method of claim 6, further comprising providing a flow cell for the pulp fiber sample, directing the pulp fiber sample into the flow cell, and holding the pulp fiber sample in the flow cell, said flow cell including a transparent wall through which the pulp fiber sample can be seen.

8. A method of analyzing a pulp fiber sample, comprising:

providing a flow cell that includes a passageway having an inlet, an outlet and a region between the inlet and the outlet that has a transparent wall;

providing a pulp fiber sample that includes a pulp fiber and a fluorescent stain bound to the pulp fiber;

directing the pulp fiber sample into the inlet of the flow cell, and from said inlet into the region between the inlet and outlet that includes the transparent wall;

using a light source to direct light through the transparent wall into the pulp fiber sample to stimulate fluorescence from the pulp fiber sample while it is in the flow cell; and

analyzing the fluorescence from the pulp sample to measure at least one property of interest in the pulp fiber sample.

9. The method of claim 8, further comprising preparing the pulp fiber sample, by preparing a fluorescent stain solution;

adding a predetermined amount of pulp fibers to a predetermined amount of the stain solution;

mixing the pulp fibers and the stain solution to disperse the pulp fibers in the solution and create a slurry; and

removing a pulp fiber sample from the slurry and mixing it with a second solution to form a pulp fiber suspension, said pulp fiber suspension constituting the pulp fiber sample.

10. The method of claim 9, wherein the second solution includes a bleach.

11. The method of claim 8, comprising holding the slurry in a container, and removing said pulp fiber sample from the container and admixing it with the second solution in a conduit, and using the conduit to direct the pulp fiber sample into the flow cell.

12. The method of claim 11, wherein the second solution includes a bleach.

13. The method of claim 1, wherein the second solution comprises dilution water and bleach present in an amount sufficient to permit reaction of the bleach with the stain in solution to an extent desired without an undesirable amount of reaction of the bleach with stain that is bound to the pulp fiber sample.

14. The method of claim 8, comprising measuring the lignin content of the pulp fiber sample.

15. The method of claim 8, comprising measuring the total charge of the fiber.

16. The method of claim 8, comprising measuring the length of the fiber.

17. The method of claim 8, comprising measuring the fiber shape.

18. The method of claim 8, comprising measuring chemical properties of the fiber.

19. Apparatus for analyzing pulp fiber, comprising:

a flow cell that includes a passageway having an inlet, an outlet and a sample holding region between the inlet and the outlet that has a transparent wall;

a conduit for delivering a pulp fiber sample to the inlet of the flow cell, and through the inlet into the sample holding

region of the flow cell, said pulp fiber sample including pulp fiber and a fluorescent stain bound to the pulp fiber;

a light source and a focused light path positioned to direct light through the transparent wall into the pulp fiber sample to stimulate fluorescence from the pulp fiber sample while it is in the flow cell; and

a fluorescence analyzer positioned to analyze fluorescence emitting from the pulp fiber sample and measure at least one property of the sample.

20. The apparatus of claim 19, wherein the light source is a xenon strobe lamp which outputs light from ultraviolet to infrared wavelengths, and said apparatus includes a filter that removes light outside of a desired range, a mirror used to reflect light from the filter towards the transparent wall of the flow cell, and an objective lens between the mirror and the transparent wall for focusing the light on the pulp fiber sample in the flow cell.

21. Apparatus for analyzing pulp fiber, comprising:

a light beam projector comprising a light source and a lens for producing a beam of light from the light source;

a first dichroic mirror;

a flow cell including a region for holding a pulp fiber sample to be analyzed, said region including a transparent window;

an objective lens spaced from the sample holding region along a substantially straight image path that is substantially perpendicular to the beam of light;

said first dichroic mirror being positioned at about a forty-five degree angle with respect to both the light beam and the substantially straight image path;

a second dichroic mirror on the side of the first dichroic mirror that is opposite the light source, the focusing lens, the flow cell and the objective lens, said second dichroic mirror extending at an angle that is substantially perpendicular to the first dichroic mirror, whereby the image

beam passes through the first dichroic mirror to the second dichroic mirror;

a first wavelength portion of the image beam will also pass through the second dichroic mirror and another wavelength portion will be reflected by the second dichroic mirror;

a first camera for recording the image that passes through the second dichroic mirror; and

a second camera for recording the image that is reflected by the second dichroic mirror.

22. The apparatus of claim 21, further comprising a processor connected to receive image data from the first and second cameras and utilize such data to determine at least one property of the pulp fiber sample that is being analyzed.